Ms. Metzler

Environmental/Ecological Science

Unit- Energy Sources

Theme-Non-Renewable / Traditionally Used / Harmful Energy Sources

Topic-Coal, Natural Gas and Biomass

**Prior Steps:**

Students will have previously been given an introductory overview of energy sources - both renewable (alternative) and nonrenewable (traditional)

**Aim:**

How can we compare characteristics of coal, natural gas and biomass as energy resources?

**Objective/ Scaffolding of Theme Objectives:**

Students will devise clues that are relevant to each energy resource.-**Bloom's taxonomy Level-Synthesis**

Students will engage in 'discrimination', choosing amongst 3 choices- coal, natural gas and biomass energy resources given characteristics (clues).-**Bloom's Taxonomy Level-Application**

Students will explain/articulate characteristics of energy sources.- **Bloom's Taxonomy Level-Comprehension**

**Next Steps:**

Students will re-enact activities for each of the' traditional' energy resources; then do the same for the 'alternative' energy sources.

**Future Step**:

Students will assess advantages versus disadvantages of alternative versus traditionally used energy sources. **Bloom's Taxonomy Level-Evaluation**

**STEM Step:**

Students will design their own method/tools through which alternative sources of energy might be extracted

**Motivation:**

Pictures/objects of each energy source

**Do Now:**

OWL- Observe / Wonder / Link

Given pictures/objects that represent coal, natural gas and biomass energy sources students will observe them, turn and talk and write for what they wonder about each and link each object to something they know about or it reminds them of (discuss with their partner/group and write)

**Mini Lesson:**

* Energy Sources information-and characteristics Smart Notebook presentation
* Discuss Vocabulary-Interactive Toolkit 2.0
* Discuss similarities/differences between the energy sources
* Discuss categories we could delineate for them (include ones we discussed in prior overview introductory lesson)
* Discuss **Guiding Questions-questions and answers** typed into NOTES on Smart Notebook Interactive Toolkit 2.0

**Guided Group Practice:-Dyads**

* Break into groups partially assigned/chosen
* Everyone in each pair will have a laminated card plastered to their forehead. Each card represents a different energy source.
* Looking at the card on your partner's create and write a list of 5-10 qualities/characteristics (each one on a separate index card/post it note of that energy source to make "clues" for your partner to use to guess the specific energy source.
* Switch roles once your partner has guessed correctly until each of you have completed clues for and guessed for all 3 energy sources.
* Be sure to mix up the energy source cards and put on your blindfold when your partner places a new card on your forehead!

**Materials:**

index cards or colored post it notes

laminated energy picture cards

Smart notebook presentation and Notes 2.0/ Google Earth to see locations

OWL organizer (earlier readiness level)

handout - characteristics of the energy sources (earlier readiness level)

Homework slips (as necessary)

Peer and Self-Assessment Rubrics

Pictures/objects of energy sources

Blindfolds

**Presentations(Summaries):**

Walk to other groups.

Exchange with them presentations and then discussions/debate of each group's findings

**Exit Slips:**

Score your partner using the peer assessment rubric

Then, using the rubric do a self-assessment of your performance

**Homework/Independent Practice:**

**Research and Write**:

Choose a renewable/alternative energy source.

Using the clues you created today, discuss in writing whether or not and how these descriptions apply to your chosen energy source.

**Quick Rubric Peer /Self-Assessment:**

Student Peer Assessment-

1. Review and check your notes and Smartboard notes.
2. Use them and the knowledge you have obtained, to assess your partner's answers in accordance with the rubric listed below.
3. Then, circle the appropriate number for each category.
4. Next, use the same rubric to assess your own performance. Write your scores for each category and person onto your exit slip.

Creation of Clues - 4-my partner created 8-10 clues for all 3 energy sources that are 86-100%

accurate

3-my partner created 6-8 clues for all 2-3 energy sources that are 70-85%

accurate

2-my partner created 4-6 clues for 1-3 energy sources that are 55-69%

accurate

1-my partner created 0-4 clues for the energy sources that are 40-54%

accurate

Indication of Answers 4-my partner guessed 2-3 energy sources correctly on the first guess

3-my partner guessed 2-3 energy sources correctly on the second or third

trial

2-my partner guessed 1-2energy sources correctly on the first, second or

third trial

1-my partner guessed 0-1 energy source correctly on the first, second or

third trial

**Differentiation Used:**

* Learner Readiness: Some students may use a set of clues given to them rather than devising their own.
* Learner Readiness - through medial summary questions and presentation questions/preparation contingencies will be made as per student population as well as

groupings for Do Now ,Guided Practice and Homework, as necessary

* Student choice- groupings / to some degree could be level of assignment (guided practice/do now /homework
* Intrapersonal intelligence use
* Interpersonal intelligence use-cooperative learning
* Verbal-linguistic intelligence use
* Naturalist intelligence use
* spatial intelligence use-using visual mapping on Smartboard / mind-mapping-to determine correct 'name' of energy source
* Mathematical-logical intelligence creating a table/chart/following and/or developing logical 'clues'
* Kinesthetic / Tactile use- manipulatives
* Auditory and Visual learning style - use of Smartboard

**Educational Philosophies**: Constructivist and Inquiry Learning

**Standards;**

**NYS:**

Standard 1 Scientific Inquiry, Key Idea 2 Standard 1 Engineering Design, Key Idea 1 Standard 2 Information Systems, Key Idea 1 Standard 4 The Living Environment, Key Idea 7

**CCLS:**

WHST

Homework: - W1.a, b, c

Guided Practice: W1.b,c

Mini Lesson: R1.a

**DOE Priority Compentencies:**

Domain 1- Planning and Preparation

* 1e-Designing Coherent Instruction

Domain 2 - the Classroom Environment

* 2b-Establishing a Culture for Learning
* 2d-Managing Student Behavior

Domain 3 - Instruction

* 3b-Using Questioning and Discussion
* 3c-Engaging Students in Learning
* 3d - Using Assessment in Instruction